

as in the French Navy may reduce the number of English readers of the book. But, happily, we possess many naval officers fully competent to take their place in scientific discussions of naval strategy and tactics. They will find much that is suggestive in Captain Vidal's book, and may be trusted to appreciate its investigations properly as well as to deduce therefrom rules for guidance, which will assist brother officers not so well instructed as themselves in the practical application of the theorems which Captain Vidal has collected. Shortly stated, the volume is better suited for the student than for the average naval officer, but it deserves a place in the professional libraries of all modern fleets.

W. H. WHITE.

THE CORRESPONDENCE OF HUYGENS.

Œuvres complètes de Christiaan Huygens. Publiées par la Société Hollandaise des Sciences. Tome dixième. Correspondance 1691-1695. Pp. 816. (Nijhoff: La Haye, 1905.)

THIS volume completes the publication of the scientific and miscellaneous letters of Huygens, the ten volumes comprising in all twenty-nine hundred letters and memoranda. There is, perhaps, not so much variety in the contents of the present volume as in those of previous ones, and the great majority of the letters of interest written during the last five years of Huygens's life have been published before, but they have now in many cases been further illustrated by the addition of rough notes from the books of *adversaria* of the author.

The correspondence with Leibnitz, which had been resumed in 1688 after a long interruption, went on regularly during the years 1691-5, dealing partly with pure mathematics, partly with the theory of universal gravitation. It shows that Huygens never became reconciled to the use of the differential calculus, but continued to prefer geometrical methods. In 1691 he acknowledges the utility of the calculus, and says that he has made some progress in it; yet in the very last letter to Leibnitz (of December 27, 1694) Huygens remarks that the new method "ne me demeure pas présente à l'esprit quand j'ai discontinué longtemps à m'y exercer." But the numerous letters and notes on the quadrature of curves, especially of the folium of Descartes, exchanged between Marquis de l'Hospital and Huygens show that the latter's power of dealing with geometrical problems was as vigorous as ever. He also continued to correspond with Fatio de Duillier, whose letters foreshadow the accusation of plagiarism which he launched against Leibnitz in 1699, as he from 1691 repeatedly assured Huygens that Newton was the discoverer of the differential calculus, and that it would not be pleasant for Leibnitz if Newton's letters to him were published. Huygens, who continued to think the new calculus unnecessary, did not omit to tell Leibnitz that, according to Fatio, Newton knew more of the inverse problem of tangents than Fatio and Leibnitz did; to which Leibnitz quietly replied that everybody had his own ways of proceeding, and perhaps he

knew of some which Newton had not yet perceived. Fatio several times mentioned in his letters that he intended to publish a new edition of the "Principia," as Newton had declined to do it himself, and proposed to expand it into a folio volume, which he flattered himself would be more easily understood than Newton's quarto.

With Leibnitz, Huygens also exchanged ideas about the nature and cause of gravitation. In 1692 Leibnitz remarked that a vortex like that assumed by Descartes is necessary to explain why the earth's axis remains parallel to itself, while the fact that all planets and satellites move in the same direction also points to their being carried along by some fluid matter. He rejects the idea of Cassini, that the orbit of a planet is not an ellipse, but a Cassinian oval, since no physical reason had been given for this hypothesis. The spherical shape of a drop of water, the fall of a body to the earth, and the motion of the planets are all, according to Leibnitz, caused by the "materia ambiens." Huygens, on the other hand, thinks that the sphericity of a drop is more likely caused by the rapid motion of some matter which circulates inside, and as to the planets he fails to see why we should assume the existence of vortices when Newton had proved that the law of inverse squares "with the centrifugal force" produces the ellipses of Kepler. He also makes other objections to the theory of Descartes, particularly to the small spheres of the second element which revolve round the accumulated first element (the sun), and are supposed to have been formed by the corners of the original matter being rubbed off; for if this matter offered any resistance to this rubbing, what should limit the resistance, and if there were none, what should prevent the total destruction of the particles? The vortex which should preserve the parallelism of the earth's axis is incompatible with the motion of the same matter in all directions which should produce gravitation; an objection to which Leibnitz could only reply that we have two such independent circulations here on the earth, causing gravity and magnetism. Huygens acknowledges that vortices are a convenient means of explaining the common direction of planetary motions, but the constant eccentricity of a planet and the variable velocity in the orbit cannot be accounted for by the theory.

In this connection it is most interesting to read some notes written by Huygens to the well known "Vie de Monsieur Descartes," published anonymously by A. Baillet in 1691. According to Huygens, Descartes was very successful in getting his conjectures and fictions accepted as truth, just as novels may be taken for real history; but, on the other hand, he dealt with tangible things, and not with mere words as earlier philosophers had done. Bacon did not understand mathematics and was wanting in penetration as regards physics, being unable even to conceive the possibility of the earth's motion, which he mocked as an absurdity. Galileo had enough of mental power and mathematical knowledge to make progress in physical science, and he was the first to make discoveries as to the nature of motion, although

he left very much to be done. He did not pretend to explain the cause of all natural phenomena, nor had he the vanity to want to be the head of a sect; he was too modest and too great a lover of truth for that. But Descartes wanted to pass for the author of a new philosophy which could take the place of the Aristotelian, and he stuck to what he had once proposed though it was often very wrong. He has done a good deal of harm to the progress of philosophy, for those who believe in him imagine that they know the cause of everything; they waste time in sustaining the doctrines of their master, and do not work to penetrate the real reasons of the great number of phenomena as to which Descartes has only propounded idle fancies. A severe judgment, but not an undeserved one as regards the tenacity with which the followers of the Cartesian philosophy clung to the vortex theory, though it hardly accounted for any of the phenomena of planetary motion.

Probably owing to the infirmities of old age, Huygens during the period covered by this volume did not do any astronomical work, though he wrote to his brother Constantyn in 1693 that he had got a tube made for a 45-feet object glass, chiefly to show the moon and planets to persons of quality who could not manage a tubeless telescope, which was pointed to an object by cords. His interest in the use of pendulum clocks at sea was unabated, and there are several short letters on this subject. As the results of repeated trials were not favourable, Huygens endeavoured to find other means of realising isochronic motion, not subject to disturbance from the rolling of a ship, and designed several forms of balance of which a full account is to appear among his hitherto unpublished works.

There are fewer allusions to current political and other events in this volume than in the previous ones, but naturally the anti-Copernican action of the University of Louvain in 1691 is not passed over. The faculty of arts suspended Prof. van Welden for three years for asserting that the earth was one of the planets. He wrote to Huygens to beg for the intercession of Constantyn Huygens or of King William, but they do not appear to have done anything for him. During the last years of his life, Huygens wrote his well known little book "*Cosmotheoros*," which was not published until 1698, three years after the death of its author.

J. L. E. D.

PSYCHIATRY.

Manual of Psychiatry. By J. R. de Fursac. Translated by A. J. Rosanoff, and edited by Dr. J. Collins. Pp. xii + 352. (New York: Wiley and Sons; London: Chapman and Hall, Ltd., 1905.) Price 10s. 6d. net.

THE author has managed to compress a fairly large amount of information into this manual, but we are afraid that the subject-matter is almost too condensed for the reader who is not already conversant with the subject. This book is divided into two parts. The first portion is a general study of the causes, symptoms, and treatment of mental disorder, con-

sidered independently of the various affections in which they are encountered. The second portion is devoted to the study of the individual psychoses.

The volume is rather unevenly divided; some subjects are fully dealt with, but the description of others is somewhat meagre. The chapter on ætiology is very good, and this important problem is thoroughly reviewed. We cannot agree with the author in his conclusion that heart disease is common in the insane, and Strecker's figures as to the prevalence of this malady in German asylums, viz. 61.7 per cent for men and 42.7 per cent. for women, would not coincide with similar statistics obtained from English asylums.

In the chapter on general symptomatology the subject of hallucinations and their causation is briefly but well described. Throughout the volume it is very noticeable that purely psychological matters are dealt with in greater detail than other subjects of equal, if not of greater, interest to the practical physician. For example, the pages on treatment are undoubtedly the weakest in the book. Very little space is devoted to this important subject, and the reader is left very much in the dark as to the management of cases of mental disorder.

The author has evidently had the usual difficulty in finding a good classification of insanity. He states that in the absence of one that is founded upon a pathological anatomy basis he has chosen "the most practical, the most convenient, and the one which in any given case would enable us to establish the prognosis and institute the treatment." We quite agree that he has made the best choice in selecting Kraepelin's classification as the basis for his own scheme.

The first chapter in the second part is reserved for the consideration of the "infectious psychoses," of which the following are briefly reviewed:—febrile delirium, infectious delirium, and hydrophobia.

Under the heading of "Psychoses of Exhaustion," the author describes conditions of primary mental confusion and acute delirium. Toxic psychoses are divided into two divisions, (a) acute, (b) chronic, morphinomania and cocaineomania being included in the second class. Dr. de Fursac recommends that, when possible, the rapid method of withdrawal of morphia should be employed in the treatment of morphinism, as he prefers this to the sudden and gradual methods sometimes employed.

The "auto-intoxication psychoses" include uræmia, the polyneuritic psychosis or Korsakoff's disease, dementia præcox, and general paresis. After thoroughly considering the relationship of syphilis to general paresis, the author states that "at the present time we have no conclusive evidence either for or against the syphilitic origin of general paresis."

The next chapters are devoted to the description of "psychoses dependent upon so-called organic cerebral affections," and "psychoses of involution." The latter include "affective melancholia" and "senile dementia." We do not like the term "affective melancholia"; it seems redundant, for clearly all forms of depression must be affective. Further, the author uses the term in a new sense, which causes